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AUTHOR Erickson, Lawrence
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ABSTRACT

Three items are described in this paper: the individual difference variable of cognitive style, research which has implicated cognitive style and reading achievement, and beginning reading research which uses cognitive style as a dependent variable. The contents include "Cognitive Style," which discusses research related to defining cognitive style and behaviors related to cognitive style; "Cognitive Style and Reading," which describes how cognitive style is related to reading and discusses two cognitive style dimensions which have been implicated with reading--dependence-independence and impulsivity-reflectivity; "Needed Research," which presents possible research in the areas of word recognition skills, psycholinguistic theory, relevant graphic cues, and the relationship between cognitive style and the self-correcting behavior of beginning readers; and "Summary," which emphasizes the need for beginning reading research to provide teachers with instructional strategies which match the cognitive style of children who are beginning to learn how to read. (WR)

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Lawrence Erickson
Reading Center
West Virginia University

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COGNITIVE STYLE: IMPLICATIONS FOR BEGINNING READING

Abstract

Cognitive style is defined and cognitive style dimensions which have been implicated with success in learning how to read are described. Studies of beginning reading which included the cognitive style variables of impulsivity-reflectivity and field dependence-independence are reviewed. The author suggests several beginning reading research studies and urges that they be carried out with the intent of seeking instructional methods which match the cognitive style of children.

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Lawrence Erickson
Reading Center
West Virginia University

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COGNITIVE STYLE: IMPLICATIONS FOR BEGINNING READING

Pre-Convention Institute

Introduction

The intent of this paper is to: 1. describe the individual difference variable of cognitive style; 2. describe research which has implicated cognitive style and reading achievement; and 3. suggest beginning reading research which uses cognitive style as a dependent variable.

The basic reason for discussing cognitive style and beginning reading is that one strategy which may optimize reading instruction, is to seek instructional methods in reading which are consistent with a child's typical mode of responding. Thus the immediate intent is to initiate interest in cognitive style

because it appears to be an important individual difference variable. The ultimate aim is to optimize beginning reading instruction by providing teachers with information they can use in order to match instruction to individuals or groups who exhibit similar response patterns.

Cognitive Style

In recent years the individual difference variable of cognitive style has been investigated. Powell (1968) stated that researchers in the area of cognitive style are interested in studying the processes which appear to underly mental abilities. Messick (1971) said that cognitive style appears to represent a person's typical mode of perceiving, remembering, thinking, and problem solving. The significance of this individual difference variable was pointed out by Powell (1968) when he stated:

> "Enough evidence is available to support the contention that children differ in their approach to learning experiences and that a learner may be any one of several different types. Each type of individual will learn most effectively when taught by methods which take his type of learning approach into account. This dimension of cognitive preference is another variable that needs to be accounted for in making provisions for individual differences." (p. 113).

Specifically, what is cognitive style? In recent years a number of response patterns have been identified. Messick (1971) lists the following nine dimensions of cognitive style:

1. Field Dependence versus Field Independence
2. Scanning
3. Breadth of Categorizing
4. Conceptual Style

Cognitive Style: (continued)

5. Cognitive Complexity versus Cognitive Simplicity
6. Reflectivity versus Impulsivity
7. Leveling versus Sharpening
8. Constricted control versus flexible control
9. Tolerance for Incongruity or Unrealistic Experiences

What behavior do these terms describe? The following description of the leveling versus sharpening dimension should serve to clarify the concept. Messick (1971) states that persons at the leveling extreme tend to merge perceived objects with similar objects recalled from previous experience. Persons at the sharpening extreme are less prone to confuse similar objects and may even judge the present object to be less similar to the past object than is actually the case. One measure of leveling-sharpening is the House Test which is described by Santostefano (1969). This test consists of 60 line drawings of a house, each printed on a card. Gradually from card to card the house changes very slightly as parts are omitted in an accumulative fashion. The child is asked to watch the cards carefully as they are presented one after another. The child is told to tell the examiner to stop when a change is noticed and tell what change is perceived. The responses are recorded until all 60 pictures are shown. Children who detect changes early, who report many many changes, and who report changes immediately upon, or soon after, a change is introduced, are considered to exhibit a sharpening cognitive style. Children who detect few changes and only long after the change is introduced are viewed as levelers.

While this description should help answer the question what is cognitive style, another more pertinent question remains; how is cognitive style related to learning how to read? In order to further explain cognitive style and to point out how reading is involved two cognitive style dimensions which have been implicated with reading will be described. They are field dependence-independence and impulsivity-reflectivity.

Cognitive Style and Reading

In describing the cognitive style dimension of field dependence-independence Santostefano (1969) states that when some children are confronted with a complex figure containing both relevant and irrelavant information, they ignore the irrelavent information and are not influenced by it. Other individuals in the same situation attend to the irrelavent information and their performance on the main task is disrupted. Two tests which tap this dimension of cognitive style in children are the Children's Embedded Figures Test and the Color-Fruit Test. For purposes of clarifying this cognitive style, a brief description of the Color-Fruit Test is presented. Santostefano (1969) points out that on the first trial of the test the child is presented a card containing 50 drawings of apples, bananas, bunches of grapes, and heads of lettuce, colored red, yellow, blue, and green respectively. He is asked to name the colors as rapidly as possible. With the second trial, the child is presented with the same colored fruit arranged identically to the first card. However, in addition, immediately surrounding each of the fruit are acromatic, line drawings of various common objects. These drawings are considered intrusive information and irrelevant

with respect to the central task, since the child is asked to try to ignore them, to pay attention only to the colors, and to name the colors as rapidly as possible. With a third trial, the child is presented with the same fruit colored incorrectly (e.g., a banana is colored red or blue, an apple, yellow or blue). The child is asked to name, as rapidly as possible, the colors that should be there. Here it is assumed that the child must suppress or ignore the intrusive, incorrect color in order to call out the correct one. Time and reading errors are recorded for each trial. Children who read the second and third cards as quickly as the first, and with few errors, are viewed as operating in terms of field independence because of their tendency to ignore irrelavent information and attend to the main task. Children who take more time on the second and third cards, and who make more errors, are considered to be field dependent because they are distracted by the irrelavent information.

The second cognitive style related to reading is impulsivity-reflectivity. Sometimes called conceptual tempo this style refers to an individual's tendency to wait and reflect on a choice before responding. In their work with cognitive style Kagan et al. (1964) found that when individuals are confronted with problem situations that require a choice among several alternatives, and when uncertainty as to the correct response is high, persons differ with respect to both the speed and accuracy with which their selection is made. Some individuals display relatively fast response times and have more errors while others display relatively longer response times and fewer errors. Those who respond relatively quickly and with more errors exhibit an impulsive conceptual tempo, while those who take relatively longer and have fewer errors exhibit a reflective conceptual tempo.

The impulsive-reflective dimension is limited to situations where a number of response alternatives are available simultaneously and the correct alternative is not obvious. The primary measure of an individual's position on the impulsive-reflective dimension is a visual recognition task called the Matching Familiar Figures Test. In this test the person is shown a picture of a single familiar object and six similar variants, only one of which is identical to the standard.

For example, the child is shown a line drawing of a teddy bear on a chair and is asked to select one of six similar drawings that is identical to the standard drawing. The child's response time to the first answer and total number of errors on a ten or twelve item test are recorded. Children who score above the median on response time and below the median on error are considered to be reflective while those who score below the median on response time and above the median on errors are considered to be impulsive.

In recent years a number of researchers have implicated both of these cognitive style dimensions with success in reading. In one of the early studies on cognitive style Kagan (1965) found that primary grade children with a reflective style were more accurate in reading English words. Conversely, children with an impulsive style made more recognition errors in reading English words. Kagan reasoned that a word recognition task is a situation with high response uncertainty in which the reflective children weighed alternative hypotheses and were more accurate "...than children who reported hypotheses impulsively without consideration for their probable validity (p.626)."

The impulsive-reflective conceptual tempo variable was used in a more recent beginning reading study reported by Erickson and Otto (1973) in which impulsive and reflective kindergarten children were identified and assigned to the alternate treatments of learning words presented in patterns of high and low intralist similarity.

Studies of intralist similarity have demonstrated that kindergarten children could learn a list of dissimilar words more rapidly than a list of similar words. But, because the dissimilar words tend to encourage word identification on the basis of single letter cues, the children made more incorrect identifications and false generalizations attempting to read new but similar words.

The treatment variable of intralist similarity and the individual difference variable of impulsivity-reflectivity were combined on the premise that in order for impulsive children to learn a list of highly similar words they would have to search for more than one letter cue. Thus, it seemed reasonable to expect that the greater number of trials required to learn the high similarity list and the repeated practice of searching for more than one letter cue would establish more accurate word recognition skill. On the other hand, impulsive children would learn the dissimilar words in fewer trials and would not tend to search for more than one letter cue which would not help establish more accurate word recognition skill. Because reflective children tend to analyze more details and consider alternatives longer they would have more accurate word recognition skills regardless of which list they learned and the effect of list similarity would be less dramatic.

Results indicated that while degree of intralist similarity had little effect on the word recognition skill of impulsive children, the reflective children who learned the list of highly similar words tended to do better on the word recognition task ($P < .10$) than reflective children who learned the low similarity list.

While the results of this study did not provide clear-cut evidence that would help in selecting word lists for teaching word recognition skills to beginning readers, that data indicate that reflective children appeared to benefit more from the high similarity word list treatment than impulsive children. Thus, it may be a good strategy to employ highly similar word lists to enhance the word recognition skills of beginning readers - provided the children tend to exhibit a reflective conceptual tempo.

In another study Smith (1973) examined the relationship between reading comprehension and the cognitive style of first grade children. He found that field dependence-independence and reflectivity-impulsivity were significantly related to the two comprehension skills of focusing on details in a short paragraph and the ability to find the main idea of a paragraph. Smith reported that:

> "The reflective subject, who studies his options for a long period of time before making a decision, is more likely to be field independent and focus on details in a paragraph." (p. 80)

Smith went on to state that "If a teacher could measure this factor (field dependence-independence, reflectivity-impulsivity) in a student, he might be able to alter his teaching style to efficiently utilize the cognitive learning style of the student having trouble with that skill." (p.81)

While these and other studies have yielded some information regarding the relationship of cognitive style and reading, there are a number of other research possibilities which must be carried out in order to provide information more useful to teachers. Indeed, we have just begun!

Needed Research

One research possibility is based upon a caution regarding some theoretical assumptions which underly cognitive style.

There is a tendency to overgeneralize and view cognitive style dimensions as fixed modes of behavior. This is unfortunate, because although the term cognitive style tends to suggest a fixed behavior pattern for a person, the basic research on cognitive style indicates that individuals use a number of different processes to handle different information in different situations. Santostefano (1969) points out very convincingly that instead of cognitive styles, individuals exhibit cognitive controls. The controls are used simultaneously and may be altered to fit different situations. For example, in one study reported by Santostefano (1969) college students were administered tests of leveling-sharpening a week before or after, and again, on the day of a final examination. They tended to shift toward increased sharpening on the exam day which suggests that sharpening is an individual's way of adapting the cognitive control to fit the testing or final exam situation. Thus, it is important to perceive cognitive style dimensions as fluid and adjustable rather than fixed.

What does this mean for instruction in general and reading in particular? First of all, in terms of beginning reading it appears that reflective behavior

enables children to tend to have better word recognition skill. And some studies have demonstrated the feasability of inducing impulsive children to be more reflective in the hope of helping them succeed in school. For example, placing impulsive first grade children with a reflective teacher has been shown to help impulsive children slow their response times (Yando and Kagan, 1968).

Following this same logic Levin (1971) pointed out "it might prove fruitful to instruct or induce poor readers to employ the habits of good readers." (p. 12). Thus, future research might attempt to induce changes in cognitive style which would reduce the difference which appears to exist between impulsive information processing behavior and the need to attend to individual letter cues and delay responding until various alternatives have been considered. For example, while intralist similarity did not make a significant difference in the word recognition skill of impulsive children, the possibility remains that combining high similarity words with induced changes in impulsive behavior could improve the word recognition skills of impulsive children.

A second research possibility stems from current psycholinguistic theory. Goodman (1972) has stressed the point that: "Children must learn strategies for predicting, sampling and selecting information, guessing, confirming or rejecting guesses, correcting, and reprocessing." (p.158). While these strategies appear to be related to the cognitive style dimensions previously discussed, it seems to make good sense to investigate to determine if cognitive style plays a role in learning these strategies. For example, it appears, on the surface at least, that the field dependence-independence variable and the ability of the reader to sample the least amount of available language cues to

reconstruct and comprehend the message are related. Goodman contends that "the reader need not use all the graphic cues available in the printed page, nor is he restricted to them." (p. 154). Perhaps field independent children naturally can withhold attention from irrelavent graphic cues while field dependent children have difficulty sampling the most relevant cues.

Thus, future research might seek to find methods/materials which would provide field dependent children with practice in sampling the most relevant graphic cues in order to improve their comprehension skills.

Another question worth investigating might be, do reflective children rely more on the grapho-phonic information and, therefore, perform better on word recognition tasks than impulsive children? On the other hand, do impulsive children rely more on syntactic and semantic information as they process information? Could it be that impulsive children, who process information rapidly and have more errors in a high response uncertainity situation, are undaly punished by a reading method which stresses exact word by word reading? Thus, because of the mismatch between their typical response pattern and the reading behavior being demanded by the method/teacher, the child experiences early reading difficulty. On the other hand, is the reflective child, who weighs alternatives before responding, better able to cope with a reading method which stresses exact word by word reading?

Another question which might prove worthy of investigating is the possible relationship between cognitive style and the self-correcting behavior of beginning readers. Goodman and Burke (1972) state that self-correcting should be reinforced on the basis that it indicates that the reader is asking himself

"does what I have just read make sense?" Could it be that the tendency to be reflective-impulsive or field independent-dependent controls the ability to self-correct? Do some children tend to learn this self-questioning behavior easier than others? If so, which ones? The point is, if this behavior is thought to be good reading behavior and that all children should learn to think this way, it would be a great help for a teacher to know if some children acquire the behavior easier than others.

Summary

So far just a few research possibilities have been suggested. The first dealt with matching cognitive style and teaching materials/methods by altering either or both. The second dealt with investigating the relationship between cognitive style and current psycholinguistic theory regarding reading comprehension. There appears to be convincing evidence that individual differences such as cognitive style must be considered. It is time to stop looking for the best teaching method or materials for teaching beginning reading to the hypothetical "average" child. What is needed now are research efforts which use individual difference variables such as cognitive style in attempts to gain definitive knowledge which will allow teachers to match specific instructional strategies to individuals or groups who exhibit similar cognitive behaviors. It appears that the basic theoretical relationship between reading behavior and cognitive style does indeed exist. What is needed now is beginning reading research which will provide teachers with instructional strategies which match the cognitive style of children who are beginning to learn how to read.

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